PATENT SPECIFICATION

DRAWINGS ATTACHED

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Improvements in or Relating to Oxidation Devices

COMPLETE SPECIFICATION

We, HEURTEY & CIE, a French Body Corporate, of 38, Avenue Georges Mandel, Paris, Seine, France, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention relates to devices adapted for obtaining the best possible oxidation of certain substances, and more particularly of metalloids such as sulphur and phosphorus.

Devices are already known for oxidising sulphur, but such known devices are expensive to build, for they all have big dimensions; moreover, their operation is subjected to troubles and even failure by accumulated impurities which they are unable to eliminate.

Therefore, an object of the invention is to avoid such drawbacks, by providing a device which is highly effective and of very much reduced dimensions.

According to the invention, an oxidation device comprises burner means arranged to operate in accordance with a known cycle which includes externally recycling the combustion products around an injection chamber, said chamber being associated with a second chamber of relatively small dimensions communicating through a restricted duct with a further chamber having means for delivering secondary air thereto for completing oxidation, said further chamber being provided at its outlet with flow-guiding means for the oxidised products.

According to a feature of the invention, said burner means has associated therewith a heat exchanger for the purpose of maintaining the treated substance, where it is fed to the burner, at a temperature suitable both for keeping said substance in the required fluid condition and preventing the spraying members from being subjected to an undue rise of temperature.

Such an intensive combustion burner is fed with a quantity of primary air slightly higher than the stoichiometric proportion in order to produce a high oxidation temperature for destroying, for example when oxidising sulphur, impurities such as hyrocarbons, so as to avoid the formation of complex gummy products.

The intensive oxidation obtained in the device of the invention produces a high velocity jet of the products which thus are energically stirred up with the secondary air to give a very homogeneous mixture within a small space.

In order that the invention may be better understood and readily carried into practice, an embodiment thereof will now be described more fully with reference to the accompanying diagrammatical drawing showing a longitundinal section of the oxidation device.

The device illustrated in the drawing comprises a cylindrical injection chamber 1 at the upstream end of which opens a suitable axial flow spray nozzle 2 fed through a pipe 3 branched off from a feeding circuit comprising an inlet pipe 4 and an outlet pipe 5. All these pipes are within a steam jacket 6 through which steam flows from an inlet pipe 7 to an outlet pipe 8, for the purpose of maintaining the temperature of the treated substance, for example sulphur, at a value corresponding to the maximum fluidity of that substance. Moreover, said jacket 6 preserves the spray nozzle 2 from any unduly high temperature.

The injection chamber 1 is surrounded by a sleeve 9 held by suitably perforated flanges 10, 11. The sleeve 9 is supported by a liner 12 which supports the inner wall of a primary air inlet jacket limited by an outside wall 14. The walls 13 and 14 are coaxial, together with the cylindrical wall of the chamber 1 and the sleeve 9. At their end adjacent the spray nozzle 2, the walls 13, 14 are curved inwardly through substantially 180°. The wall 14 is fitted with a primary air inlet pipe

(Price 3s. 6d.)

connection 15.

The primary air is led between the inwardly curved portions to enter the chamber 1 in a substantially axial jet around the atomized spray delivered from the nozzle 2. The primary air jet and the spray meet with a strong turbulent action. The primary air produces a very active oxidation of the sulphur, attended with a partial recycling of the oxidised products flowing back through the holes in the flanges 10, 11, as will be explained presently. The injection chamber 1 is followed downstream by a relatively small second or primary combustion chamber 16 having a restricted outlet duct 17 and wherein prevails a relatively high pressure. The holes in the flange 10 are subjected to this high pressure, whereas the holes in the flanges 11 are subjected, inside the curve of the wall 13, to a reduced pressure due to the suction effect of the primary air inlet flow.

The restricted outlet duct 17 opens into a further or secondary combustion chamber 18, through the upstream end wall 19 of which, around the duct 17, extend circumferentially spaced ducts 20 converging towards the axis of the chamber 18 from an annular manifold 21 fed with secondary air through a pipe 22. Said chamber 18 has a perforated downstream wall 23 acting as flow rectifying and directing means to calm the turbulency of the outlet gases. A duct 24 leads the oxidation products from the outlet wall 23 to the place of utilisation.

The oxidation of sulphur is thus operated at the highest possible temperature in spaces of very reduced dimensions and is completed in the chamber 18 in the presence of excess oxygen. The mixture is led through the duct 24 to conventional catalysis chambers. Said mixture is homogeneous and its temperature and oxygen content may be controlled by means of the secondary air fed through the ducts 20.

It will be appreciated that, owing to its small dimensions, the construction of such an apparatus is possible in the most economical conditions.

Of course, without departing from the scope of the present invention as defined in the appended claims, modifications may be made in the features of the embodiment described and illustrated. Moreover, although the invention has been described more particularly in relation with the oxidation of sulphur, it should be understood that it is not limited thereto, as it is clear that it applies as well to the oxidation of phosphorus, for example, and other substances.

WHAT WE CLAIM IS:

1. An oxidation device comprising burner means arranged to operate according to a known cycle which includes externally recycling the combustion products around an injection chamber, said chamber being associated with a record chamber of relatively small dimensions communicating through a restricted duct with a further chamber having means for delivering secondary air thereto for completing oxidation, said further chamber being provided at its outlet with flow guiding means for the oxidised products.

2. An oxidation device as claimed in Claim 1, comprising a spray nozzle connected to a pipe extending as a branch from a feeding circuit through which the substance to be oxidised can flow, said nozzle and said circuit being surrounded by a preheating jacket extending to a wall through which the nozzle extends.

3. An oxidation device as claimed in Claim 1, wherein said restricted outlet is surrounded by secondary air inlet pipes which converge.

4. An oxidation device as herein before described and as shown in the annexed drawing.

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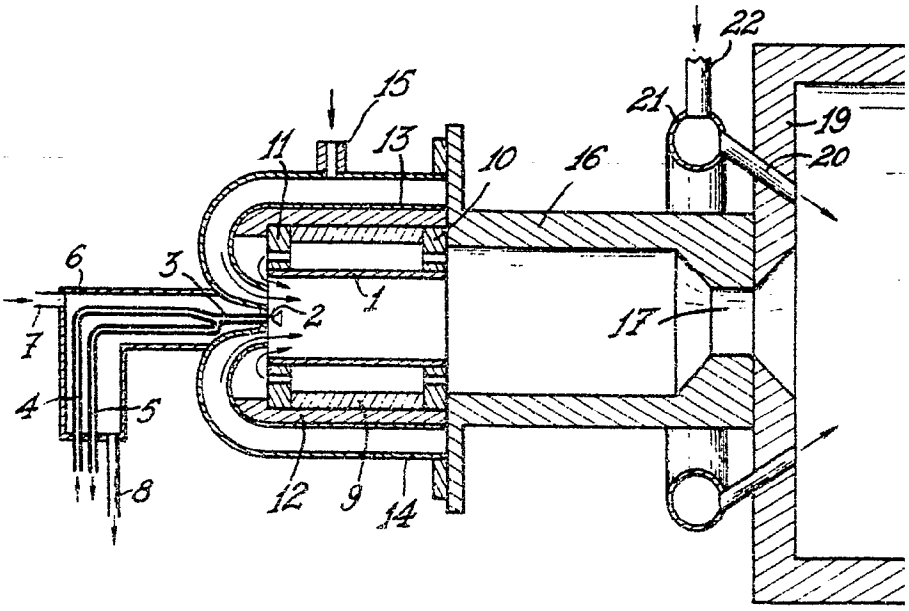
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827,627 COMPLETE SPECIFICATION

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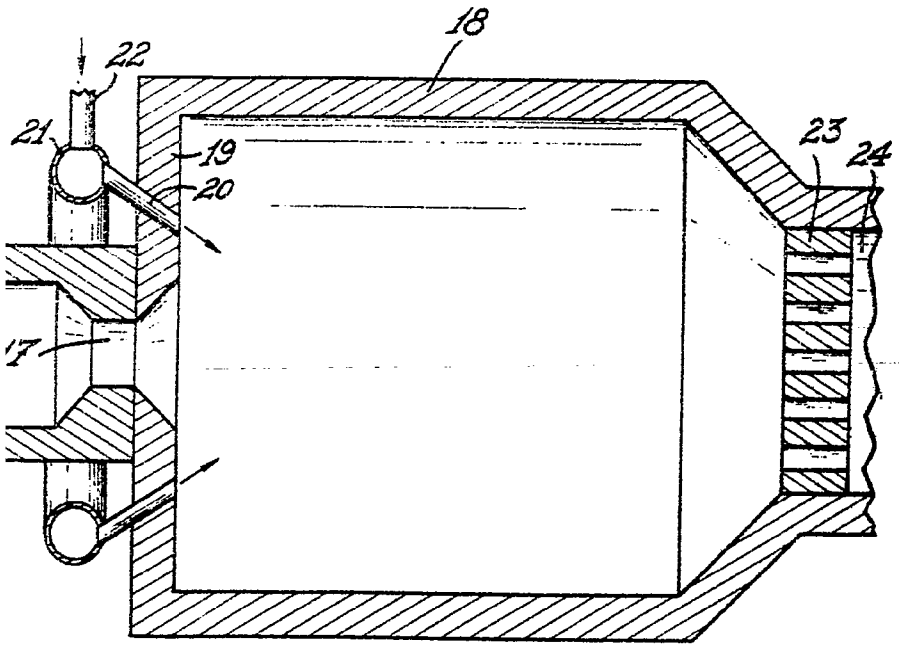

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